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A COMPARISON OF SEBAGO, CHEROKEE, AND KENNEBEC POTATOES IN RELATION TO THEIR SUITABILITY FOR SHIPPING AND MANUFACTURE OF POTATO CHIPS

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Report of a study in which certain phases were
carried on under the Research and Marketing Act of 1946.

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INTRODUCTION

Better varieties of Irish potatoes adapted to the Southeastern producing areas are continually being sought. For a variety to be acceptable for commercial purposes it must not only be suitable from the standpoint of production but also possess qualities that will enable it to be marketed successfully.

In the Hastings area of Florida, the Katahdin variety replaced the Spaulding Rose during the period 1938 to 1941, but it was soon replaced by the Sebago variety, which was planted on about 95 percent of the acreage in 1950 (1). In 1950 the new late blight resistant variety Kennebec was recommended for trial by growers in the Hastings area (1). Cherokee[2/], another late blight and also scab resistant variety was tested by Eddins et. al. (1) for three years at Hastings and Sanford, Florida. In five trials the average yield of Cherokee was 114 percent of that of Sebago (1) but, it was dropped from the tests in 1951 "because of the tendency of the variety to form knobs at the eyes and stem ends of the tubers as they approached maturity."[3/]

During the 1950 season, shipping tests were made at Charleston, South Carolina comparing the Kennebec and Sebago varieties. Results from these tests indicated that the Kennebec variety was unsuited for commercial shipping and handling when grown under South Carolina conditions (3). Commercial growers in the Hastings area who tried the Kennebec variety experienced results similar to those obtained in the shipping tests at Charleston. This made it desirable to get more definite information on how this variety responded to commercial shipping and handling when grown in the Hastings area.

[1/] The authors wish to acknowledge the participation of the following persons whose efforts contributed greatly to this study: Jack Kaufman, Assistant Pathologist, for the collection of data in the terminal market; R. C. Wright, Physiologist, and T. M. Whiteman, Associate Horticulturist, for making the potato chip test, all of the Division of Handling, Transportation and Storage of Horticultural Crops, Bureau of Plant Industry, Soils and Agricultural Engineering, U. S. Department of Agriculture; Dr. A. H. Eddins, Pathologist, Potato Laboratory, Florida Agricultural Experiment Station, for growing the Kennebec and Sebago potatoes and cooperating in harvesting the potatoes; B. J. Todd, D. E. Crawford, and R. D. Ward of the Department of Agricultural Economics of the South Carolina Agricultural Experiment Station for help in harvesting and preparing the test shipments; Miles Potato Corporation, Hastings Potato Growers Association, and Florida Planter's Inc., growers and/or shippers in the Hastings Area for their cooperation.

[2/] Listed as B61-3 before it was named.

[3/] From unpublished data supplied by Dr. A. H. Eddins.

The Cherokee variety was tried in South Carolina and was liked by growers in that state. Seed dealers encouraged producers in the Hastings area to grow the variety so it was also included in the shipping and handling tests made in 1952. The information from these tests should be of value to growers and shippers in better appraising the merits of the Kennebec and the Cherokee varieties, in comparison with Sebago, the standard variety, for commercial production in the Hastings area.

METHODS

The tests were designed to compare the varieties when they were grown according to recommendations for commercial producers and handled through commercial packing houses and shipping facilities.

Each variety was planted on January 17, 1952. The Sebago and Kennebec potatoes were grown in adjoining locations at the Hastings potato laboratory. Certified seed were used and the varieties received identical treatment as far as fertilizer and cultivation practices were concerned. Both were fertilized with a 5-7-5 fertilizer at the rate of 2400 pounds per acre. The Sebago potatoes were sprayed six times with Nabam + Zinc Sulphate, four of which also contained DDT. The Kennebec potatoes were sprayed four times with only DDT because of the resistance of the variety to late blight. However, by the time of the last digging (109 days after planting) the foliage of the Kennebec variety was killed by early blight while the foliage of the Sebago variety remained fairly healthy.

The Cherokee potatoes were grown about ten miles from Hastings on a farm near East Palatka.[4] They were planted with certified seed and were fertilized with a 6-7-7 fertilizer at the rate of 2200 pounds per acre. Both the 5-7-5 and the 6-7-7 fertilizers contained 1% nitrate nitrogen and 2% magnesium. The Cherokee potatoes were sprayed three times with Nabam + Zinc Sulphate and DDT. The Cherokee potatoes showed no evidence of early blight and the foliage remained fairly healthy during the growing and harvesting period.

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[4] It was decided to include the Cherokee variety in the tests too late to grow it on the station farm. The test potatoes were taken from the plantings of a commercial grower.

Since the Cherokee potatoes were not grown adjacent to the Sebago and Kennebec potatoes, the physical conditions under which they were grown may have been different. This may affect the relationships in this report where the results are related to physical conditions. However, very favorable weather existed during the 1952 growing and harvest season so it is believed there was not a great deal of difference in the physical conditions under which the three varieties were grown.

The practice in the Hastings area has been to harvest the potato crop about 95 days after planting. During the past few years there has been a tendency to delay the harvest in order to increase maturity and thereby reduce skinning. In making these comparisons, three tests were made. Tubers of each of the three varieties were harvested at 95, 102, and 109 days after planting (i.e. on April 21, April 28, and May 5, 1952) in order to cover a range of maturities.

In each test the three varieties were harvested and handled through the washing, grading, and packing operations in the same way as the commercial crop is handled in the Hastings area. Each variety received identical treatment during the harvest period. They were dug with a one-row Champion digger, picked up in rubber-coated wire baskets and put in field bags. The same field crew was used for each variety at all diggings.

Potatoes from the test varieties dug at the three harvest dates were washed, dried with hot air, and graded on commercial equipment in the same packing house. They were packed in 100 pound burlap bags. In each test, two twenty-five pound samples were collected for each variety before and after grading. Commercial grading records of size "A", "B" and utility grades were obtained for the first two tests but not for the third.

At each digging three test bags of size A potatoes of each variety were placed in comparable positions in the load of two commercial shipments and sent to New York City by rail and/or motor truck. The positions selected were those that represented different degrees of exposure in the load. Potatoes in the test bags were examined on arrival at New York and after a one week holding period in the market. Because of the relatively large quantity of potatoes from the Hastings area sold to potato chippers, a bag of each variety was shipped to Beltsville, Maryland, by railway express at each harvest date to be tested for suitability for making potato chips.

Potatoes from the first digging were graded the day they were dug and loaded the following day into a truck and a railroad car. The truck shipment was ventilated through 3 or 4 small openings, 1 to 2 inches wide, extending across the top of the load. Tests bags in the truck were located near the incoming air (bag 1) and in the top (bag 2), and middle (bag 3) layers near the center of the truck. The railroad car was shipped with vents open to Jacksonville where it was iced and the vents closed. The vents were opened again at Potomac Yards in Alexandria, Virginia. The test bags were located in the top (bag 4), middle (bag 5), and bottom (bag 6) layers of stacks 5, 6 and 7 in the north end (end nearest the locomotive) of the car.

The potatoes from the second digging were graded and loaded into a railroad car and motor van the day they were dug. They were located in positions almost identical to the first shipments. Both loads were ventilated enroute. The third digging was made in the afternoon and the potatoes were graded and loaded the following day. The test bags were placed in the top (bags 1 and 4), middle (bags 2 and 5), and bottom (bags 3 and 6) layers of the load near the center of a truck and a van. Both loads were ventilated enroute.

All test bags were weighed at the shipping point and in the terminal market to determine weight losses enroute and during a one week holding period at about 70° F. and 55 percent relative humidity in the terminal market. A Ryan recording thermometer was placed in a test bag located near the middle of each load to obtain commodity temperatures in transit.

Specific gravity measurements were made at the shipping point for each variety at all diggings.

To get additional information on the effects of exposure in the field on browning, scald spots and sticky scald spots, special exposure tests were made at the shipping point when a test was made. At each digging about 200 pounds of potatoes of each variety were picked up as soon as possible after they were dug. These potatoes were placed in the protection of a shed and later that day or the next they were exposed to the weather for periods ranging up to two hours.

RESULTS

Data obtained in these tests provide a measure of some of the factors related to the digging, grading, shipping and chipping qualities of Cherokee and Kennebec varieties as compared to Sebago when grown in the Hastings, Florida, area.

Skinning

The first and most obvious characteristic in which the varieties differed was in the amount of skin removed in the handling processes. Cherokee tubers skinned less than Sebago and Sebago slightly less than Kennebec (Figure 1). This is parallel to their rated periods of maturation since Cherokee is rated as midseason, Sebago a late, and Kennebec a very late maturing variety. A great deal of skin was removed in the washing and grading process but very little or none was lost between grading and the terminal market except for potatoes from the third digging. There was an increase in maturity during the period of the test which resulted in a considerable reduction in the amount of skinning. From the first to the third digging the estimated amount of skinning at the end of grading decreased from 60 to 22 percent in Sebago, 50 to 5 percent in Cherokee, and 75 to 30 percent in Kennebec. By the time the potatoes reached the terminal market, the decrease in skinning from the first to the third digging was from 62 to 50 percent for Sebago, 40 to 20 percent for Cherokee, and 75 to 60 percent for Kennebec potatoes.

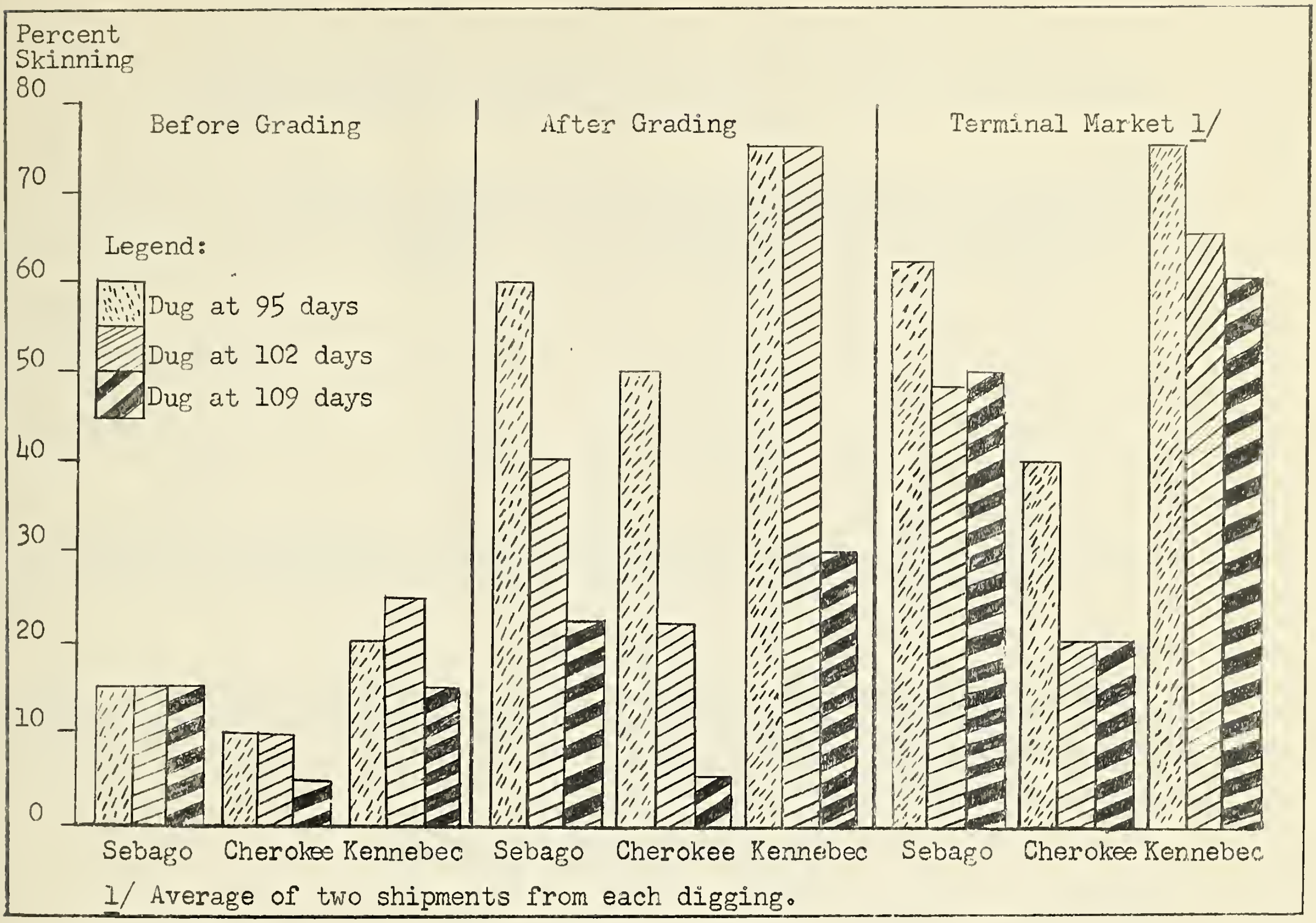

Figure 1.- Estimated Percentage of Skin Removed from Sebago, Cherokee and Kennebec Potatoes Before Grading, After Grading, and On Arrival in New York City, When Dug at 95, 102, and 109 Days from Plantings, Hastings, Florida, 1952.

Blackleg, Deep Pitted Scab, and Greening

When dug, potatoes of the Sebago variety usually contain an appreciable amount of blackleg and greening, but only small amounts of deep pitted scab because this variety has some resistance to this disease (2). In these tests, Kennebec potatoes developed as much or more blackleg and greening as Sebago and considerably more deep pitted scab (Table 1). Potatoes of the Cherokee variety which is also resistant to scab (4) developed very little if any of these three defects. Since Cherokee was not grown beside the Sebago and Kennebec these differences may not be comparable for this variety. Primarily because the amount of blackleg, deep pitted scab and greening was less, the

Table 1.- Amount of Blackleg, Deep Pitted Scab and Greening in Samples of Sebago, Cherokee and Kennebec Potatoes Collected Before Grading, Hastings, Florida, April - May 1952. 1/

Defect	Pounds of defects per 100 pounds of field run potatoes in:		
	Sebago	Cherokee	Kennebec
Blackleg	0.6	0.0	0.7
Deep Pitted Scab	0.4	0.0	6.1
Greening	2.1	0.3	2.9
Total	3.1	0.3	9.7

1/ Average of two 25-pound samples collected from each of 3 diggings.

grading records for the first diggings showed that only 4.3 percent of the Cherokee potatoes were removed from the U. S. No. 1 grade as defective, whereas 9.6 and 9.3 percent, respectively of Sebago and Kennebec potatoes were removed.

Mechanical and Handling Damage

In these tests, nearly all injuries found in each variety at the shipping point were minor or non-grade defects (Figure 2). For all three diggings, the amount of mechanical injuries in the potatoes before they were graded was much less in Sebago than in Cherokee or Kennebec. In samples collected after grading, Sebago potatoes in the first two diggings contained considerably less injuries than the other varieties, but only slightly less injuries in the third digging than the other two varieties. Cherokee potatoes were injured slightly less than Kennebec potatoes in nearly all comparisons. Fewer injuries developed in the Cherokee and Kennebec tubers as age increased, but there was little change in the amount of injuries in the Sebago variety. The resistance of Sebago potatoes to injuries is of practical importance since much of the decay found at the terminal market starts at injuries (2). The ability of Sebago potatoes produced in the Southeast to with-stand handling well has been established (2).

Loss of Weight

Despite rather consistent and large differences in skinning of the three varieties, the average weight loss in transit varied from only 3.4 percent in the Cherokee variety to 3.7 percent in both the Sebago and Kennebec varieties (Table 2). However, during the one week holding period in New York, Cherokee

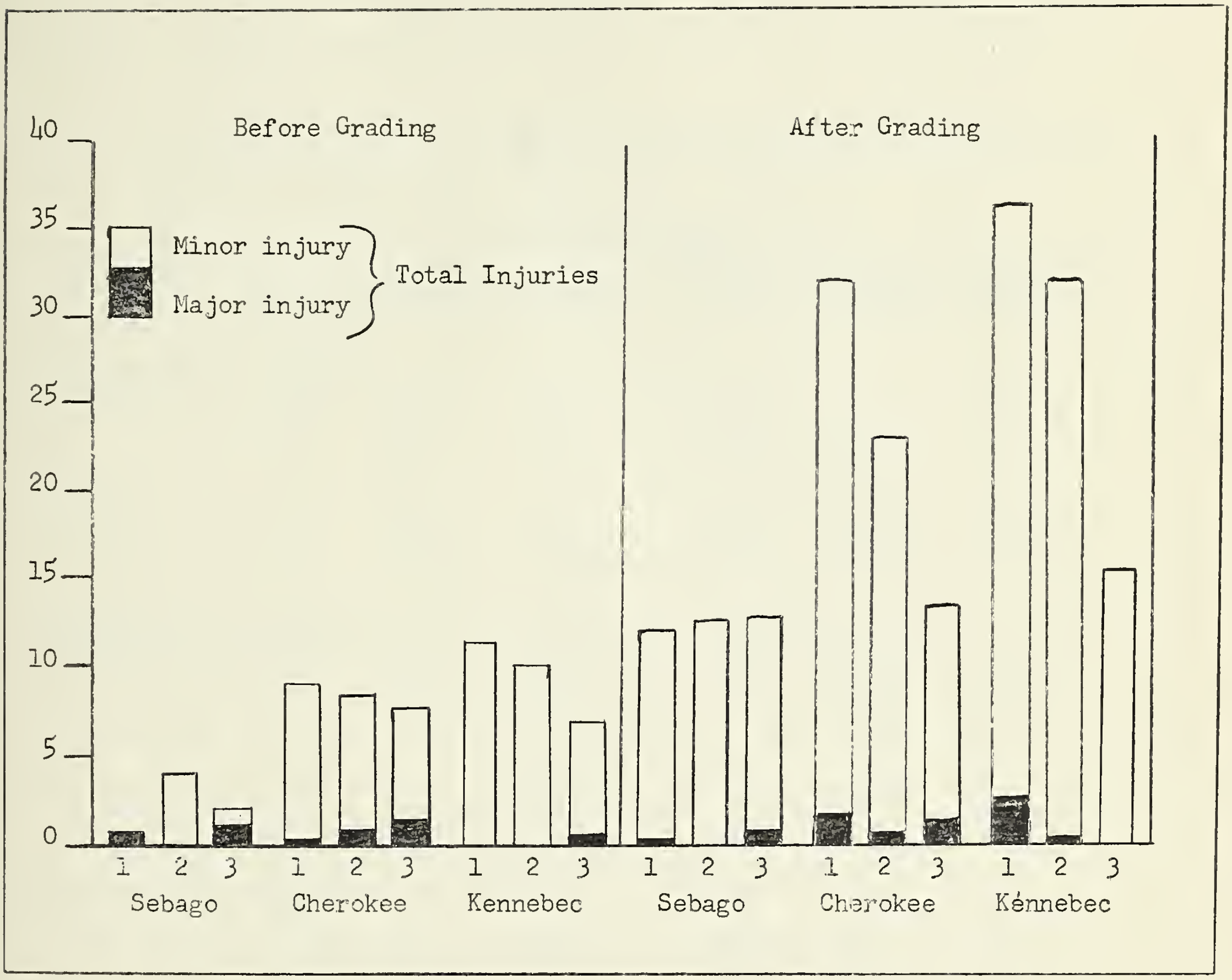

Figure 2.- Percentage of Sebago, Cherokee, and Kennebec Potatoes Containing Mechanical Injuries in Samples Collected Before and After Grading When Dug at 95 (1), 102 (2), and 109 (3) days from Planting, Hastings, Florida, April - May 1952.

potatoes lost on the average about 20 percent less weight than Sebago or Kennebec potatoes. The Cherokee potato appeared to reach the same degree of maturity a few days earlier than either of the other varieties. The additional maturity resulted in less skinning and this apparently caused less weight loss in the Cherokee variety during the holding period than for the other varieties. In all varieties the amount of weight lost during the holding period decreased with age and was less in potatoes from the third digging than in potatoes from the first digging.

Table 2.- Percentage Weight Lost in Transit and During One Week Holding Period at 70° F. for Sebago, Cherokee, and Kennebec Potatoes Shipped from Hastings, Florida to New York, April - May 1952.

Shipment	Test Bag No.	Percentage Weight Loss: In transit: Sebago	Cherokee	Kennebec	While holding 1 week at 70° F.: Sebago	Cherokee	Kennebec
A. 1st digging - April 21							
1 (Truck)	1	7.9 1/	4.2	4.3	4.0	3.5	4.0
	2	2.6	3.3	2.7	4.3	3.6	3.9
	3	2.7	2.5	3.4	4.2	3.6	4.0
2 (Car)	4	3.3	3.7	3.7	4.8	2/	6.4
	5	3.2	2.8	3.2	5.0	3.1	5.3
	6	3.2	3.4	3.8	5.2	3.8	5.3
B. 2nd digging - April 28							
3 (Van)	1	3.6	2.7	2.7	3.6	2.8	3.9
	2	2.1	1.0	2.1	3.7	3.2	4.8
	3	2.4	4.8	2.7	4.3	5.0	5.5
4 (Car)	4	3.1	1.3	2.5	4.0	2.8	5.1
	5	2.8	2.1	5.0 3/	5.5	3.0	2.7
	6	2.9	2.8	2.5	3.8	3.0	2.8
C. 3rd digging - May 5							
5 (Van)	1	5.8	5.2	5.7	2.9	2.3	2.1
	2	5.3	4.6	4.6	1.8	2.2	2.2
	3	3.7	3.6	4.5	3.4	1.9	2.1
6 (Truck)	4	5.3	5.8	6.1	3.3	2.1	2.3
	5	3.5	4.1	3.6	3.6	2.7	3.3
	6	4.0	4.0	4.0	2.9	2.0	3.0
Average		3.7	3.4	3.7	3.9	3.0	3.8

1/ Bag more exposed than comparable Cherokee and Kennebec bags.
2/ No data available.
3/ Bag torn in transit.

Decay

Commodity temperatures obtained near the center of the loads, while en-route were only moderately favorable for the development of decay[5] (Table 3). The amount of decay in the test bags was generally small (Table 4). On arrival in New York the 18 test bags of Sebago potatoes averaged only .08 percent decay while comparable bags of Cherokee and Kennebec averaged .36 and .49 percent, respectively. After the potatoes were held for one week at about 70° F. an additional .10 percent decay developed in the Sebago potatoes as compared with .52 percent in Cherokee and .49 percent in Kennebec potatoes. None of the test bags of Sebago potatoes developed as much as 1.0 percent decay in transit or on holding. However, 2 bags of Cherokee and 3 bags of Kennebec potatoes contained over 1.0 percent decay on arrival, and after holding, an additional 3 bags of Cherokee and 4 bags of Kennebec potatoes developed 1.0 percent or more decay.

Table 3.- Commodity Temperatures Near Center of Load in Test Shipments of Sebago, Cherokee and Kennebec Potatoes Shipped from Hastings, Florida to New York City, April - May 1952.

Time in Transit	Date of Loading					
	April 22, 1952		April 28, 1952		May 6, 1952	
	1 (Truck)	2 (Car)	3 (Van)	4 (Car)	5 (Van)	6 (Truck)
	° F.	° F.	° F.	° F.	° F.	° F.
12 hours	74	66	72	69	74	75
1 day	73	65	69	67	76	77
2 days	71	68	67	64	71	64
3 days	60	47	67	62	59	61
4 days		45		54		
5 days		46		52		
6 days		47		54		
7 days		49				

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[5] Temperatures below 70° F. are unfavorable for the development of soft rot in transit or storage.

Scald Spots and Browning[6]

Desiccation caused some injury in the form of scald spots and browning. In transit an average of 1.8 pounds per 100 pounds of Sebago tubers developed

Table 4.- Percentage Decay[1] in Test Bags of Sebago, Cherokee and Kennebec Potatoes from Hastings, Florida, on Arrival and After Holding One Week at 70° F. in New York City, April - May 1952.

Shipment	Test Bag No.	Percentage Decay					
		On Arrival			After holding 1 week at 70° F.		
		Sebago	Cherokee	Kennebec	Sebago	Cherokee	Kennebec
A. 1st digging - April 21							
1 (Truck)	1	.0	1.5	.2	.0	.1	.2
	2	.6	.0	.0	.0	.0	.0
	3	.0	.0	.0	.0	.0	
2 (Car)	4	.2	3.8	1.2	.0	.2	.4
	5	.0	.3	5.9	.0	.0	.0
	6	.0	.0	.0	.0	.9	.0
B. 2nd digging - April 28							
3 (Van)	1	.0	.0	1.0	.0	.6	.8
	2	.0	.0	.6	.9	.2	.8
	3	.0	.0	.0	.0	.0	.0
4 (Car)	4	.0	.0	.0	.3	.0	.4
	5	.0	.0	.0	.0	.6	.0
	6	.0	.0	.0	.0	.4	.6
C. 3rd digging - May 5							
5 (Van)	1	.4	.0	.0	.4	3.1	2.0
	2	.0	.0	.0	.0	.0	1.3
	3	.0	.8	.0	.0	1.1	1.2
6 (Truck)	4	.0	.0	.0	.0	.4	1.1
	5	.0	.0	.0	.0	1.8	.0
	6	.2	.0	.0	.2	.0	.0
Average		.08	.36	.49	.10	.52	.49
Number of bags containing 1.0 percent or more decay:		.0	2	3	0	3	4

[1] Primarily bacterial soft rot.

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[6] Damage to potatoes from exposure to the weather is of two general types (1) desiccation damage, and (2) heat injury. Desiccation damage may be in the form of surface or superficial brown discoloration of the skinned areas (browning), or in more severe cases the skinned areas become sunken and discolored (scald spots) and may become sticky with bacterial or fungal growth (sticky scald spots).

scald spots as compared with 7.2 and 6.9 pounds, respectively, for the Cherokee and Kennebec tubers (Table 5). The difference between varieties was particularly noticeable on potatoes from the third digging which lost considerable weight in transit. Browning was least noticeable on the Cherokee potatoes and most noticeable on the Kennebec potatoes on arrival as well as after holding one week in the terminal market (Table 6). Tubers of the Cherokee variety were brighter and more attractive than those of either the Sebago or the Kennebec varieties on arrival and after holding. By the end of the holding periods the appearance of the Kennebec tubers was usually poor and many slightly shrivelled.

Table 5.- Amount of Scald Spots on Arrival at New York City in Sebago, Cherokee and Kennebec Potatoes Shipped from Hastings, Florida, April - May 1952.

Shipment	Test Bag No.	Pounds of potatoes per 100 pounds affected with scald spots in:		
		Sebago	Cherokee	Kennebec
A. 1st digging - April 21				
1 (Truck)	1	1.8[1]	.4	.3
	2	.0	.0	.2
	3	.0	.3	.9
2 (Car)	4	2.6	7.6	7.8
	5	1.2	1.1	2.7
	6	3.6	3.5	4.4
B. 2nd digging - April 28				
3 (Van)	1	.8	1.4	1.0
	2	1.9	.5	7.3
	3	.5	.0	1.2
4 (Car)	4	.6	.0	6.3
	5	.5	.0	5.9
	6	1.3	.3	5.1
C. 3rd digging - May 5				
5 (Van)	1	2.6	17.0	12.4
	2	2.0	27.5	14.2
	3	2.1	13.2	15.7
6 (Truck)	4	5.0	26.5	14.7
	5	2.0	17.2	5.0
	6	4.4	12.8	19.1
Average		1.8	7.2	6.9

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[1] Bag more exposed than comparable Cherokee or Kennebec bags.

The differences between the test varieties in their tendencies to develop scald spot or browning were also observed in three exposure tests made at the shipping point. After each digging, 200 pounds of each variety were exposed on the ground to the weather. A 25-pound sample was picked up each 15 minutes so as to measure the effects of different amounts of exposure. The results of the three tests were similar so the data were averaged. During the early stages of exposure, browning was greatest on Kennebec and least on Cherokee potatoes (Table 7). After 30 minutes of exposure Cherokee and Kennebec potatoes developed some scald spots whereas Sebago potatoes did not. Cherokee and Kennebec potatoes developed some sticky scald spots after 60 minutes of exposure while none developed in Sebago potatoes exposed the same length of time. As the length of time the potatoes were exposed increased, some browning

Table 6.- Amount of Sebago, Cherokee and Kennebec Potatoes from Hastings, Florida Affected with Browning, On Arrival in New York City and After Holding One Week at 70° F., April - May 1952.

Shipment	Test Bag No.	Pounds of potatoes per 100 pounds affected with browning:					
		On Arrival			After holding 1 week at 70° F.		
		Sebago	Cherokee	Kennebec	Sebago	Cherokee	Kennebec
A. 1st digging - April 21							
1 (Truck)	1	.0	.5	1.2	18.2	1.8	14.7
	2	.0	.0	1.4	6.0	1.1	7.6
	3	.0	.0	2.9	6.3	.0	8.6
2 (Car)	4	.8	.4	1.8	17.6	10.1	35.3
	5	.6	.0	1.0	14.8	9.0	36.4
	6	.3	.0	2.5	16.2	11.4	30.7
B. 2nd digging - April 28							
3 (Van)	1	4.3	.0	7.2	14.5	6.4	23.5
	2	1.3	.0	2.1	12.1	4.0	29.1
	3	.6	.1	.4	12.1	6.4	33.0
4 (Car)	4	3.9	.4	6.4	9.0	3.6	25.3
	5	1.2	.3	8.7	10.1	2.0	22.0
	6	3.4	.5	5.5	12.9	3.2	27.0
C. 3rd digging - May 5							
5 (Van)	1	7.4	.0	7.3	34.0	12.4	41.0
	2	3.7	.0	2.5	30.9	8.0	37.2
	3	3.4	.0	4.1	24.8	6.7	39.8
6 (Truck)	4	4.7	.8	8.7	23.0	17.9	37.7
	5	2.2	.0	4.1	19.4	7.8	31.3
	6	2.2	.0	6.3	17.3	7.6	26.7
Average		2.2	.2	4.1	16.1	6.6	28.2

Table 7.- Amount of Browning, Scald and Sticky Scald Spots in Samples of Sebago, Cherokee, and Kennebec Potatoes When Exposed for Different Length Periods at Hastings, Florida, April - May 1952 1/.

Length of Exposure	Pounds of defect per 100 pounds of field run potatoes scored as 2/			
	Browning	Scald	Sticky Scald	Total
Minutes				
		Sebago		
15	6.0	0.0	0.0	6.0
30	22.1	0.0	0.0	22.1
45	42.0	10.4	0.0	52.4
60	34.8	31.7	0.0	66.5
75	28.0	52.1	1.1	81.2
90	21.3	58.1	9.2	88.6
105	5.2	68.3	17.7	91.2
120	0.5	62.3	22.1	84.9
		Cherokee		
15	1.5	0.0	0.0	1.5
30	14.5	3.2	0.0	17.7
45	29.3	18.4	0.7	48.4
60	16.9	32.7	3.1	52.7
75	10.0	42.7	9.2	61.9
90	8.1	29.2	29.3	66.6
105	5.5	41.3	26.0	72.8
120	3.4	39.1	27.6	70.1
		Kennebec		
15	16.3	0.0	0.0	16.3
30	42.0	2.0	1.1	45.1
45	57.7	13.6	0.0	71.3
60	28.8	45.9	5.6	80.3
75	17.6	54.9	4.9	77.4
90	7.1	70.9	11.3	89.3
105	2.7	50.9	27.9	81.5
120	0.1	56.1	23.9	80.1

1/ Data represents an average of 3 tests, one after each digging. Twenty-five pound samples were used in each test.

2/ Each of these defects are a variation of the other. With an increase in exposure, browning progresses into scald and scald into sticky scald. With added exposure, the total damage may increase even though the amount of browning and scald may decrease.

progressed into scald and then into sticky scald, reflecting greater damage. Thus with exposure, total damage increased even though the amount of browning and scald may have decreased.

Suitability for Potato Chips

Potato chips made from potatoes of the three varieties at each digging were rated as to acceptability from a color standpoint, i. e. the darker the chips the lower the rating. Chips with a color rating of 70 or above are saleable; those with a rating of 75 to 85 are of a light golden color that is preferred by most persons. When received at Beltsville, Maryland, three to four days after digging, all varieties made good chips (Table 8). Some chips were almost too light in color.

Table 8.- Average Color Ratings of Potato Chips from Sebago, Cherokee, and Kennebec Potatoes Grown at Hastings, Florida, Stored at Specified Temperatures for Different Length Periods, Harvested April and May 1952. 1/

Storage Period (days)	Storage Temperatures:					
	40° F.	50° F.	55° F.	60° F.	70° F.	80° F.
		Sebago				
0 2/	-	-	-	-	-	93
4	85	82	82	85	83	85
7	73	77	77	83	80	85
10	70	77	82	83	82	78
		Cherokee				
0 2/	-	-	-	-	-	88
4	73	72	78	78	83	83
7	63	67	75	77	77	80
10	55	65	72	73	75	80
		Kennebec				
0 2/	-	-	-	-	-	85
4	73	73	78	75	78	83
7	58	63	70	75	77	82
10	57	57	68	73	80	80

1/ The higher the rating the lighter the color of the chip. Ratings below 70 are considered unsatisfactory. Ratings for the three diggings were quite similar so the three tests were averaged.

2/ On arrival at Beltsville, Maryland, 3 to 4 days after digging. The potatoes were transported from Hastings to Beltsville by Railway Express.

Samples of the potatoes were held at 40, 50, 55, 60, 70 and 80° F. and chips made after they were stored 4, 7, and 10 days. Maturity had no apparent effect on the chip colors so the ratings for the three diggings were averaged. In general, the lighter colored chips were produced from potatoes stored at warmer temperatures. The color of the chips became progressively darker the lower the storage temperature and the longer the storage period. Sebago potatoes made satisfactory chips after storage at 40° F. for 10 days but both Cherokee and Kennebec potatoes made chips that were too dark after storage at either 40° or 50° F. for 7 days. The chips made from Sebago potatoes were lighter colored than those made from either Cherokee or Kennebec potatoes in 17 out of 18 comparisons.

Specific Gravity

The specific gravity of the three varieties is shown in table 9. Until the vines were killed by early blight, the average specific gravity of Kennebec potatoes was higher than Cherokee which in turn was higher than Sebago potatoes. A fairly heavy rain occurred just prior to the second digging. This lowered the average specific gravity of the potatoes of all three varieties. By the third digging both Cherokee and Kennebec potatoes had regained or exceeded the average specific gravity readings of the first digging but Sebago potatoes had not. The variation in specific gravity of individual tubers increased with maturity except for a high variation in the Cherokee variety at the first digging.

Table 9.- Specific Gravity of Sebago, Cherokee, and Kennebec Potatoes at Three Maturities, Hastings, Florida, April - May 1952. 1/

Date of Digging	Sebago		Cherokee		Kennebec	
	Specific Gravity		Specific Gravity		Specific Gravity	
	Average	Standard Deviation	Average	Standard Deviation	Average	Standard Deviation
April 21	1.0773	.0066	1.0780	.0080	1.0790	.0054
April 28	1.0737	.0072	1.0759	.0068	1.0778	.0060
May 5	1.0732	.0089	1.0795	.0075	1.0791	.0071

1/ Not less than 150 potatoes were used for each determination. The potatoes were scored as just sinking in salt solutions differing by .01 from each other. A weighted average was obtained by assuming the potatoes averaged at the center of the class intervals.

DISCUSSION AND SUMMARY

The prevention of decay and the maintenance of appearance are of considerable concern to everyone marketing potatoes. In these tests, the tendency for Cherokee and Kennebec potatoes to develop more decay than Sebago counts seriously against them. The chance for the development of decay in injuries and at scald spots was greater in these two varieties than in the less easily injured Sebago.

Cherokee potatoes were attractive and bright as compared with Kennebec potatoes whereas Sebago potatoes were intermediate. However, the Cherokee variety had the disadvantage of being somewhat irregular in shape and had the tendency to develop second growth as was noted by Eddins[7] and by others when released (4).

These tests conducted at Hastings, Florida, confirm the results of previous tests at Charleston, South Carolina in 1950 (3) which showed that the Kennebec variety is more prone to develop mechanical or handling damage, browning, scald spots, and decay than Sebago. It had a higher average specific gravity, but did not produce chips equal in color to those of Sebago potatoes, especially when the potatoes were held at 40° or 50° F. It developed as much blackleg and greening and was more susceptible to scab than Sebago.

The Cherokee variety exceeded the Sebago in maturing earlier, having a higher average specific gravity, less weight loss during the holding period and in the development of less browning. The tubers had a bright attractive appearance, skinned less easily, and only a few contained damage due to blackleg, deep pitted scab or greening. The Cherokee variety was more prone to develop mechanical or handling damage, scald spots and decay than Sebago. Potato chips made from it were not equal in color to those made from Sebago, especially when the potatoes were stored at 40° or 50° F. If the variety is grown, precaution should be taken to handle it carefully to avoid mechanical injuries, desiccation damage, and soft rot.

LITERATURE CITED

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[7] See footnote 3.